RF signal receiving means for controlling the amount of RF energy transmitted to said receiving unit thereby to conserve on the amount of power obtained from said power source;

second control means coupled to said RF energy receiving means, to said rechargeable battery, to said RF signal transmitting means and to said implantable medical device, for adjusting the charging current flowing into said rechargeable battery, as a function of (a) the charge level of said rechargeable battery, (b) selected charging rate ~~(fast or slow)~~, and (c) selected power supply for the implantable medical device ~~(battery only, RF energy only, or a combination of both)~~

[said receiving unit including RF energy receiving means, RF signal transmitting means, a rechargeable power supply coupled to said RF energy receiving means and second control means coupled to said rechargeable power supply means, to said RF energy receiving means, to said RF signal transmitting means and to said implanted medical device].

2. (Amended) The system of claim 1 wherein said receiving unit includes a titanium housing enclosing said RF energy receiving means, said RF signal transmitting means, said rechargeable [power supply] battery and said second control means.

3. (Amended) The system of claim 1 wherein said RF energy [transmission] transmitting means of said transmitting unit is constructed [and arranged] to transmit energy at a frequency [between] as low as 10 Hz and up to at least 20,000 [500,000] Hz.

4. (Amended) The system of claim 1 wherein said rechargeable [power supply] battery has a temperature sensor which is mounted closely adjacent thereto and which is coupled via said RF signal transmitting means to said first control means [in said receiving] of said transmitting unit whereby the [recharging of said rechargeable power supply can be controlled relative to the temperature of said rechargeable power supply thereby to prevent gas generation and loss of electrolyte by said rechargeable power supply] level of transmitted RF energy can be reduced proportionally to the reduction in charging rate of the rechargeable battery in said receiving unit, in order to reduce the power consumption from said power source powering said transmitting unit.

5. (Amended) The system of claim 1 wherein said RF energy transmitting means of said transmitting unit [is constructed and arranged to recharge] includes mode selection means for recharging said rechargeable [power supply] battery at a "fast" (high energy) rate or at a "trickle" (low to medium energy) rate.

6. (Amended) The system of claim 1 wherein said transmitting unit includes [mode] power source selection means for setting said [transmitting] receiving unit to [operate in one of three modes, namely (1) "RF only", (2) "battery only" or (3) "combination"] obtain its operating power from (1) RF coupled energy ("RF only" mode), (2) said rechargeable battery ('battery only" mode) or (3) automatically switch to "RF only" upon detection of said RF energy field, or "battery only" when said RF energy field is not detected ("combination" mode).

7. (Amended) The system of claim 6 wherein said receiving unit includes: (a) means for rectifying said RF energy into a relatively high D.C. voltage, (b) means for regulating said high D.C. voltage into a lower D.C. voltage, and (c) means for detecting the presence of said RF energy field,

said receiving unit, when [said transmitting unit is] set to operate in said "RF [only] coupled energy" mode, is operable to supply regulated electrical energy to said implantable device [through a rectifier directly to said implanted medical device,] so long as said transmitting unit is located proximate to said receiving unit and said receiving unit is sensing transmitted RF energy.

8. (Amended) The system of claim 6 wherein said receiving unit, when said transmitting unit is set to operate in said "battery only" mode, is operable, periodically, to supply electrical energy to said implantable device from said rechargeable power supply for a period of at least [7 days] 24 hours.

9. (Amended) The system of claim 6 wherein said receiving unit, when [said transmitting unit is] set to operate in said "combination" mode, is operable to supply regulated D.C. electrical energy to said implantable device [through a rectifier directly to said implanted medical device], so long as said transmitting unit is located proximate to said receiving unit, and, separately, to "trickle charge" said rechargeable [power

supply] battery to maintain same fully charged.

10. (Amended) The system of claim 1 wherein said first control means of said transmitting unit [is constructed and arranged to control] includes means for controlling the level of RF energy transfer from the transmitting unit to the receiving unit relative to one or more of [various] one or more of the following parameters: [which include] (a) the charge level of said rechargeable battery [proximity of said transmitting unit to said receiving unit], (b) selected charging rate ~~(fast or slow)~~, [the output voltage of said rechargeable power supply] and (c) the [temperature of said rechargeable power supply] selected power supply for said receiving unit ~~(battery only, RF energy only, or a combination of both)~~.

11. (Amended) The system of claim 1 wherein said [system is constructed and arranged so that said] receiving unit comprises means for measuring the charge level of said rechargeable battery and,, upon sensing a fully charged [power source] battery, [will] automatically [terminate the transmission of RF energy by said transmitting unit, by telemetering a specific] up-links a coded signal which commands said transmitting unit to "stop" [command to said] transmitting [unit] RF energy.

12. (Amended) The system of claim 1 wherein said transmitting unit includes a visual display coupled to said first control means.

13. (Amended) The system of claim 1 wherein said transmitting unit includes a keyboard coupled to said first control means.

14. (Amended) The system of claim [9] 13 wherein said keyboard includes keys to start and stop recharging [the] of said rechargeable [power source] battery within the implantable medical device.

19. (Amended) The system of claim 1 wherein said transmitting unit [has a self contained power supply, such as] includes a battery, whereby said transmitting unit is portable and not dependant upon an a.c. power source.

20. (Amended) The system of claim 19 wherein said [self contained power source in said transmitting unit is] battery can be a rechargeable battery or a non-rechargeable battery.

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NEW CLAIMS

--21. The system of claim 1 wherein said RF energy transmitting means of said transmitting unit includes mode selection means for setting said transmitting unit to operate in one of the following modes: "RF only", "battery only" or a "combination of both".

a3

--22. The system of claim 21 wherein said RF energy transmitting means of said transmitting unit controls the amount of RF energy transmitted and,

(a) when said implanted receiving unit is set to operate in said "RF only" mode, said transmitted RF energy is automatically adjusted to the amount of RF energy required (i) to operate said implanted device and (ii) to maintain said rechargeable battery, which is powering said implanted device, in a fully charged state;

(b) when said implanted receiving unit is set to operate in said "battery only" mode, said transmitted RF energy is automatically adjusted to the amount of RF energy required (i) to operate said implanted device and (ii) to recharge quickly said rechargeable battery which is powering said implanted device; and,

(c) when said implanted receiving unit is set to operate in said "combination of both" mode, said receiving unit is set to switch automatically to either said "RF only' mode upon detecting said transmitted RF energy, or to said "battery only" mode upon detecting a loss of said transmitted RF energy.

--23. An RF coupled implantable medical system comprising:

a transmitting unit;

a receiving unit including an implantable, electrically operated, medical device ;

said transmitting unit including RF energy transmitting means, RF signal receiving means and first control means coupled to said RF energy transmitting means and to said RF signal receiving means for controlling the amount of RF energy transmitted to said receiving unit;

said receiving unit including RF energy receiving means, RF signal transmitting means, a rechargeable power supply coupled to said RF energy receiving means and second control means for

28

adjusting the charging current flowing into said rechargeable battery coupled to said rechargeable power supply means, to said RF energy receiving means, to said RF signal transmitting means and to said implanted medical device, and

mode selection means for setting said receiving unit to operate in one of the following modes: (1) "RF only", (2) "battery only" or (3) "combination of both".

--24. The system of claim 23 wherein said receiving unit, when said transmitting unit is set to operate in said "RF only" mode, is operable to supply electrical energy to said implantable device, so long as said transmitting unit is located proximate to said receiving unit and said receiving unit is sensing transmitted RF energy.

--25. The system of claim 23 wherein said receiving unit, when said transmitting unit is set to operate in said "battery only" mode, is operable, periodically, to supply electrical energy to said implantable device from said rechargeable power supply for a period of at least 7 days.

--26. The system of claim 23 wherein said receiving unit, when said transmitting unit is set to operate in said "battery only" mode, is operable, periodically, to supply electrical energy to said implantable device from said rechargeable power supply for a period of at least 24 hours.

--27. The system of claim 23 wherein said receiving unit, when said transmitting unit is set to operate in said "combination" mode, is operable to supply electrical energy to said implantable device through a rectifier directly to said implanted medical device, so long as said transmitting unit is located proximate to said receiving unit, and, separately, to "trickle charge" said rechargeable power supply.

--28. An RF coupled implantable medical system comprising:

a transmitting unit;

a receiving unit including an implantable, electrically operated, medical device;

said transmitting unit including RF energy transmitting means, RF signal receiving means and first control means coupled to said RF energy transmitting means and to said RF signal receiving means for controlling the amount of RF energy

transmitted to said receiving unit;

said receiving unit including RF energy receiving means, RF signal transmitting means, a rechargeable power supply coupled to said RF energy receiving means and second control means for adjusting the charging current flowing into said rechargeable battery coupled to said rechargeable power supply means, to said RF energy receiving means, to said RF signal transmitting means and to said implanted medical device; and,

a3

said receiving unit comprising means for measuring the charge level of said rechargeable battery and, upon sensing a fully charged battery, automatically up-linking a coded signal which commands said transmitting unit to "stop" transmitting RF energy.--

REMARKS

The Examiner's rejection of claims 1-20 under 35 U.S.C. § 112, second paragraph, for being indefinite, as this rejection may be applied to amended claims 1, 3, 6, 7, 10, 11, 12, 13, 14, 19 and 20 is respectfully traversed.

In support of this traverse, it is to be noted that applicants have amended the rejected claims to render same more clear and definite and have amended the language in these claims somewhat along the lines suggested by the Examiner.

In any event, applicants submit that the claim amendments read for themselves and that the amended claims obviate and render moot the Examiner's rejection under 35 U.S.C. § 112.

The Examiner's rejection of claims 1, 3, 5, 10, 12, 15, 17, 19 and 20 under 35 U.S.C. § 102(b) for being anticipated by the Schulman U.S. Patent No. 3,942,535, as this rejection may be attempted to be applied to the amended claims, is respectfully traversed.

In support of this traverse, it is to be noted that in claim 1, the second control means is now defined more specifically. The second control means refers to a current DAC (Digital to Analog Converter) incorporated into the implanted medical device (receiver). This DAC supplies the charging current to the rechargeable battery and its output current is controlled by a μController as a function of (a) proximity and alignment of said transmitting unit to said receiving unit, (b) the output voltage of said rechargeable battery, (c) the temperature of said

30